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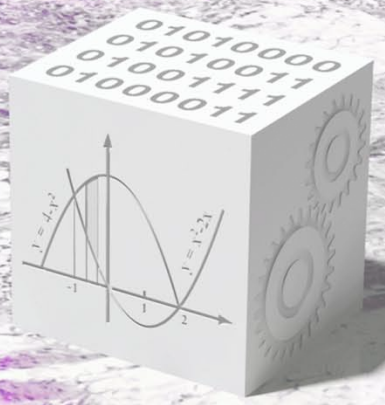

PHYSICAL SCIENCES in ONCOLOGY

Physical Sciences-Oncology Centers (PS-OC) Pre-Application Webinar

April 30, 2014

Sean E. Hanlon
Division of Cancer Biology
National Cancer Institute, NIH

NIH National Institutes of Health

Integrating Multiple ‘Perspectives’

The Whole is More Than the Sum of its Parts

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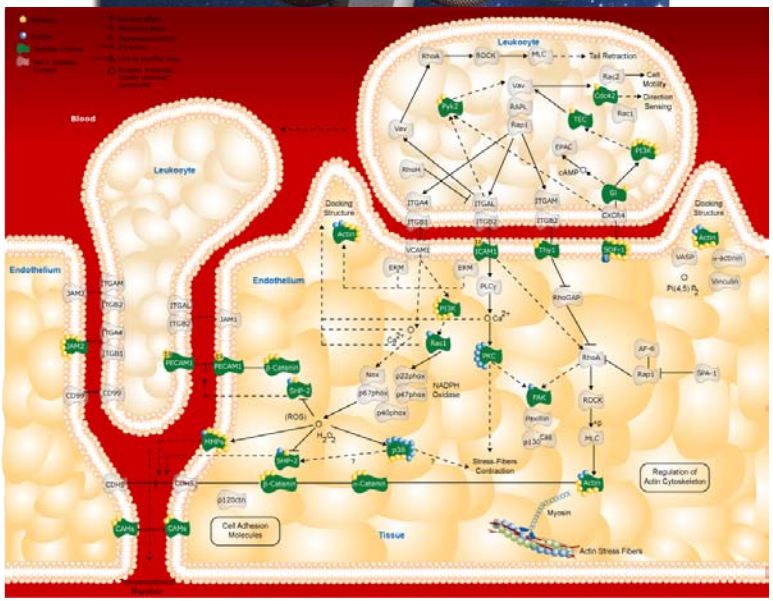
Cancer Researcher

- What cell, molecule, tissue is it?
- What genes are turned on or off?
- What changed?
- Where does this feed into other pathways?
- Do I see the same thing in several tumors?



Physical Scientist

- How much energy is needed to do this?
- How much force does it take to cross this barrier?
- Are reactions rates altered during this process?
- How much time does it take?
- What are the spatial effects?

Different ‘views’ of the same picture

Integrating both of these complementary perspectives yields a more comprehensive (clearer) picture of what cancer is and how it functions at all levels

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The NCI Leverages the Physical Sciences for New Frontiers in Oncology

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APHELION

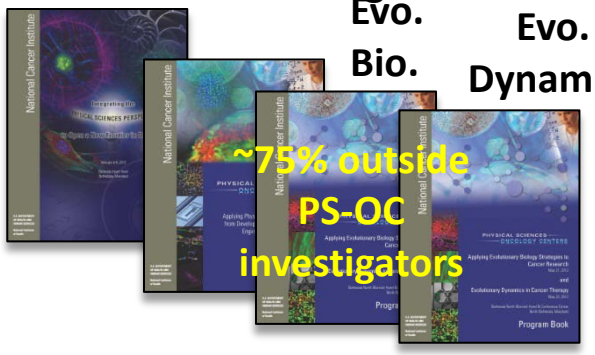
Kickoff Meeting | Site Visits | Europe Workshop | Report | Site Visits | Asia Workshop | Final Report

PS-OC RFA Sep 12 Awards | Feb | May | Jun | Aug | Jun | Nov | Feb

Pre-Award Think Tanks

~300 extramural participants

Feb Think Tank | Apr Dev. Bio. Tissue Eng. | May Evo. Bio. | Jun Evo. Dynamics | Nov Redox Phys-Onco



PS-ON PARs Phase II Approved

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The Future of the Physical Sciences-Oncology Network (PS-ON)

Original PS-OC Program (FY09-14):

- **RFA**
- **12 U54 PS-OCs**
- **4 Themes:**
  - Physics (Physical Laws and Principles) of Cancer
  - Evolution and Evolutionary Theory of Cancer
  - Information Coding, Decoding, Transfer, and Translation in Cancer
  - De-convoluting Cancer's Complexity

Physical Sciences-Oncology Network:

- **PAR; Type 1 (new) Applications**
- **Centers – Physical Sciences-Oncology Center (PS-OCs; U54s)**
- **Projects – Physical Sciences-Oncology Projects (PS-OPs; U01s)**
- **2 Themes (suggested):**
  - The Physical Dynamics of Cancer
  - Spatial Organization and Cancer

Goals of the PS-OC Program

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- Facilitate team science and **field convergence** at the intersection of physical sciences and cancer research
- Build a transdisciplinary network that **collectively tests** physical sciences based theories and models of cancer
- Connect physical sciences perspectives with translational research by **reducing barriers** between physical scientists and physician scientists
- Establish a **sustainable physical sciences perspective** within the cancer research community

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Mechanism of Support & Funding

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Mechanism of Support: U54, Specialized Center-Cooperative Agreements

*The spectrum of activities comprises a **multidisciplinary attack** on a specific disease entity or biomedical problem area. These differ from program project in that they are usually developed in response to an announcement of the programmatic needs of an Institute or Division and subsequently **receive continuous attention from its staff**. Centers may also serve as regional or **national resources for special research purposes**, with funding component staff helping to identify appropriate priority needs.*

Application Type: All submissions will be Type 1 (new applications)

Budget: Not to exceed $1.5M per year (*direct costs*) per Center. *(Cap is exclusive of 3rd party F&A costs)*

Project Period: Not to exceed 5-years

PS-OC Leadership Expertise

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PAR Language:

"Due to the transdisciplinary nature of the projects and the focus on collaboration and expertise sharing, this FOA strongly encourages the use of the multi-PD/PI mechanism. … The Center Program Director/Principal Investigator (PD/PI) (contact PD/PI for applications with multiple PDs/PIs) ***must be*** a scientist with formal training and expertise in the ***physical sciences and/or engineering***. Each applicant team ***must also include*** an additional PD/PI or other senior/key person with primary expertise in ***cancer research***."

Physical Sciences and/or Engineering

- ❑ *Engineering*
- ❑ *Chemistry*
- ❑ *Computer Sciences*
- ❑ *…*
- ❑ *Materials Sciences*
- ❑ *Mathematics*
- ❑ *Physics*

Cancer Research

- ❑ *Cancer Biology*
- ❑ *Epidemiology*
- ❑ *…*
- ❑ *Oncology*
- ❑ *Pathology*

Expertise can be established through training and / or a body of work that demonstrates impact on the field.

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Thematic Areas of Interest

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Suggested themes as defined in Part 2, Section I of PAR-14-169

The Physical Dynamics of Cancer

- ***Overview:*** ***Physical properties such as mechanical cues, transport phenomena, bioelectric signals, and thermal fluctuations*** can modulate the behavior of cancer cells, the microenvironment, tumors, and the host and may regulate (+/-) the initiation and progression of cancer.

Spatio-Temporal Organization and Information Transfer in Cancer

- ***Overview:*** Appropriate spatial and temporal ***organization of structures across all length scales (e.g., subcellular, cell, tissue, organ, whole organism) and time scales*** is required for managing the transfer of information that is critical for controlled growth.

Organization of Individual PS-OCs

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PS-OC Framework	**Each Center will be nucleated around a *physical sciences-based* organizing framework that *focuses its research, training, and outreach efforts*. The framework will *define the overall research direction* of a Center and identify fundamental question(s) in cancer research that will be addressed by the Center.**
Administrative Core	**Administrative Cores will *manage and coordinate* all Center research and activities and serve as the liaisons between the Centers and the Network.**
Research Projects	**A *well developed research program (2-3 projects)* that demonstrates and *supports the organizing framework* will form the foundation of each Center.**
Shared Research Resources	**While not required, Shared Resource Cores (0-2) may be established to *provide expertise and resources that support* and integrate multiple Research Projects.**
Education and Outreach Unit	**PS-OC Education and Outreach Units will coordinate the *education, training, career development, and scientific outreach activities* of the Center.**

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The Physical Sciences-Oncology Network (PS-ON)

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PS-OP #1
Organizing Framework
Research Program
Trans-Network

PS-OC #1
Organizing Framework
Core 1
Core 2
Project 1
Project 2
Trans-Network Project
Education & Outreach Unit
Pilots Projects

PS-OP PAR – NOT-CA-14-039
- **Physical Sciences-Oncology Projects**
- **U01 mechanism**
- **Expected release fall 2014; expected first receipt date winter 2015**
- **Contact Nas Kuhn (nas.kuhn@nih.gov)**

Trainee Exchanges, Courses, Website etc.
$100K/yr

Pilot Projects

$100K/yr

External Research Communities

Pilot Projects

Trans-Network
Research Program
Organizing Framework
PS-OP #2

Trans-Network Project
Education & Outreach Unit
Pilots Projects
Core 1
Core 2
Project 1
Project 2
Organizing Framework
PS-OC #2

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Key Dates

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	Pre-Application Webinar	Letters of Intent Due Dates	Application Due Dates	Review Dates	Earliest Anticipated Start Dates
Round 1	April 30, 2014	May 9, 2014	June 9, 2014	August / September 2014	April 2015
Round 2	TBD	January 15, 2015	February 26, 2015	May / June 2015	September 2015
Round 3	TBD	October 14, 2015	November 25, 2015	February / March 2016	July 2016

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Letter of Intent (LOI)

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- **Due Date: May 9, 2014; January15, 2015; October 14, 2015**
- **Highly encouraged but not required**
- **Standard elements:**
  - **Descriptive title of proposed activity**
  - **Name(s), address(es), and telephone number(s) of the PD(s)/PI(s)**
  - **Names of other key personnel**
  - **Participating institution(s)**
  - **Number and title of this funding opportunity**
- ***Additional recommended elements:***
  - ***Provide a brief description of PS-OC organizing framework (3-5 sentences)***
  - ***Include Relevant Expertise (s) and Keyword(s)***

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Application & Submission Information

PHYSICAL SCIENCES— in ONCOLOGY

Electronic submission is required for PAR-14-169

NIH's new ***Application Submission System & Interface for Submission Tracking (ASSIST)*** is available for the electronic preparation and submission of multi-project applications through Grants.gov to NIH. Applications to this FOA must be submitted electronically; paper applications will not be accepted. ***ASSIST replaces the Grants.gov downloadable forms*** currently used with most NIH opportunities and provides many features to enable electronic multi-project application submission and improve data quality, including: pre-population of organization and PD/PI data, pre-submission validation of many agency business rules and the generation of data summaries in the application image used for review.

ASSIST Website:
https://public.era.nih.gov/assist/public/login.do

ASSIST Webinar:
http://grants.nih.gov/grants/webinar_docs/webinar_20130813.htm

Problems accessing or using ASSIST should be directed to the eRA Commons Help Desk.

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Application & Submission Information

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Component Types Available in ASSIST	Research Strategy/Program Plan Page Limits
Overall	12
Admin Core	6
Project	12 *per Research Project*
Core	12 *per Shared Resource Core*
Educ Outreach Unit	6

- **Overall:** Required
- **Admin Core:** Required
- **Projects:** Required; 2-3
- **Cores:** Optional; 0-2; if proposed, each Core must support at least two Projects
- **Educ Outreach Unit:** Required

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Overall Component – Research Plan *(see FOA Part 2, Section IV for details)*

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- *Center Organization.* The Overall component should include a concise description of the structure of the Center including the organizing framework.
- *Center Integration.* Applications should explicitly discuss the integration of work proposed in the application.
- *Center Expertise.* The Overall component should demonstrate that the Center will include the necessary expertise and support the team science environment needed to complete the proposed transdisciplinary work.
- *Research Projects.* Briefly describe each project, including its scientific integration with the proposed organizing framework.
- *Shared Resource Cores.* Briefly describe any Shared Resource Cores, including the projects supported by the Core.
- *Education & Outreach Unit.* Briefly describe plans for Education and Outreach programs.
- *Pilot and Trans-Network Projects.* Concisely describe the Center's strategy for integrating these projects into the overall Center.

Administrative Core – Research Plan *(see FOA Part 2, Section IV for details)*

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- *Center Advisory Committee.* The CAC should include the PD/PI, one additional physical scientist, two cancer researchers, and one voting NCI Project Scientist (to be named after award). Additionally the CAC should include non-voting external scientific advisors.
- *Management and Communication Plan.* The application should describe the plans for management and integration of Center activities and communication and evaluation of progress across the Center.
- *Pilot and Trans-Network Projects.* Provide a brief description of strategies to solicit and develop Pilot Projects within the Center and develop Trans-Network projects in collaboration with the PS-ON Steering Committee.
- *Annual Meeting and Other Network Activities.* Provide a brief description of strategies for connecting and integrating the Center with the broader PS-ON.
- *Center and Program Evaluation.* The Administrative Core should coordinate participation in Center program evaluation activities.

Research Projects – Research Plan *(see FOA Part 2, Section IV for details)*

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- Each application should consist of *two to three* Research Projects (*12 page Research Plan limit per Research Project*)

- This section should describe the *overall research strategy* for the Research Project and provide a concise discussion of how the Project is *integrated within the Center*. The Research Project should focus on innovative approaches that integrate *physical sciences and cancer research perspectives* to address fundamental question(s) in cancer research.

- If the Research Project will utilize the Shared Resource Core(s), the application should describe how the *Core(s) capabilities impact the proposed project*.

Shared Resource Cores – Research Plan *(see FOA Part 2, Section IV for details)*

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- Each application should consist of *zero to two* Shared Research Cores (*12 page Research Plan limit per Shared Resource Core*)

- The Shared Resource Core may be physical or virtual infrastructure *providing a biological or physical science resource* that supports other Center components in their activities.
- Each Shared Resource Core is expected to *support two or more Research Projects* and the services and resources provided to other Center components should be clearly defined.
- Issues to be addressed include, but are not limited to: *value* of the Core services to the Center and Research Projects, *integration* between the Core and Projects, *quality control*, procedures for selecting Projects to use the Core and *allocating resources*, cost effectiveness, and increased *efficiency*.
- *Training* in complex techniques and methods should be described if they are functions of the proposed Core.
- These shared resources *must not duplicate analogous resources* already established in the applicant institutions (although supplemental funding to such existing resources may be requested).

Education & Outreach Unit – Research Plan *(see FOA Part 2, Section IV for details)*

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- The Education & Outreach unit will serve to promote the *education, training, and career development of researchers at all career stages* and to disseminate advances and capabilities of physical sciences in oncology research to the broader cancer research and physical sciences communities. Potential activities include but are not limited to:
  - *Boot camps.* Hands-on interactive training opportunities.
  - *Research opportunities.* Summer research programs that bring undergraduate or medical students into PS-OC labs.
  - *Courses.* Undergraduate or graduate courses that focus on the integration of physical sciences and cancer research.
  - *Seminar series.* Hosting of speakers that can disseminate the capabilities and advances of the Network to the broader cancer research and physical sciences communities.
  - *Workshops.* Small focused meetings that bring together the physical sciences and cancer research communities.
  - *Personnel Exchanges.* Exchange of graduate students, postdoctoral fellows, or investigators within a Center or across the Network to facilitate the exchange of knowledge and ideas.
  - *Cross-training.* Opportunities for early stage and established investigators in the physical sciences to work in cancer research or vice versa.
  - *Center Website.* Establishing a Center website to communicate the Center's mission, describe the availability of Center funding opportunities, and disseminate research data, software, training information and other resources.

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Application Review Information

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- Consider the *FOA specific review questions* defined in Part 2, Section V
- Scored Review Criteria *for Overall Component and each Research Project*
  - Significance
  - Investigator(s)
  - Innovation
  - Approach
  - Environment
  - *Integration*
- Each *Shared Resource Core and the Education & Training Unit* will be scored using a *bulleted list of review criteria* rather than the standard criterion scores

Contact Information

PHYSICAL SCIENCES— in ONCOLOGY

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Questions?